



Features of the Course of Cholelithis Disease in Elderly People with Diseases of the Internal Secretion Glands

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Abstract: The number of patients with cholelithiasis and endocrine pathology increase at elderly age. The patient's age over 60 years is one of the risk factors of complications after cholecystectomy. The aim of this study is to investigate the effect of endocrine disorders on immediate results of surgical treatment of elderly patients with cholelithiasis. **Materials & methods.** 295 patients with cholelithiasis were operated on: 107 (36.3%) patients over 60 years (main group) and 188 (63.7%) patients younger than 60 years (control group). **Results & discussion.** The correlation between the age of the patients and severity of gallbladder's inflammation was determined ($r=0.176$; $p=0.002$). The choledocholithiasis was diagnosed in 14 (13.1%) cases in the main group and in seven (3.7%) cases in the control group ($p=0.003$). Endocrine disorders were indicated at elderly patients more often (81.3% vs 67.7%; $p=0.011$). Open and conversion operations were performed at patients over 60 years more often (30.8% vs 9.0%; $p<0.001$). 14 (13.1%) patients of the main group and six (3.2%) patients of control group had postoperative complications ($p=0.001$). The hospital stay of elderly patients was longer ($Me=10.0$ days vs $Me=8.0$ days; $p<0.001$). The following correlations of elderly patients were established: between severity of gallbladder's inflammation and waist circumference ($r=0.239$; $p=0.013$), between severity of gallbladder's inflammation and the level of glucose ($r=0.218$; $p=0.024$), between severity of gallbladder's inflammation and concentration of calcium ($r=-0.450$; $p<0.001$); between the rate of purulent-inflammatory postoperative complications and the level of thyrotropic hormone ($r=0.273$; $p=0.008$), between the rate of purulent-inflammatory postoperative complications and hyperglycemia ($r=0.211$; $p=0.029$), between the rate of purulent-inflammatory postoperative complications and open cholecystectomy ($r=0.235$; $p=0.015$); between hospital stay and waist circumference ($r=0.197$; $p=0.047$), between hospital stay and concentration of thyrotropic hormone ($r=0.304$; $p=0.010$), thyrotropic hormone and the level of calcium ($r=-0.250$; $p=0.022$). **Conclusion.** The endocrine disorders complicate the course of cholelithiasis at elderly patients that is accompanied by the increase of rates of postoperative complications and hospital stay..

Keywords: cholelithiasis, endocrine diseases, elderly patients.

I. Introduction

Gallstone disease (GSD) is diagnosed in 10-20% adult population of economically developed countries. Endocrine diseases (ED) and metabolic disorders belongs to important role in the occurrence of

gallstones. In the older age group, the number of people with both cholelithiasis and endocrine pathology is growing. Therefore, in a number of patients' elderly and senile age are simultaneously diagnosed with cholelithiasis and ED. The surgical method is considered the leading method in the treatment of patients with cholelithiasis.

Despite the widespread introduction of minimally invasive techniques and improvement of preoperative preparation, the patient's age over 60 years remains a risk factor postoperative complications (POC). Complications occur in 5- 24% in patients operated on for cholelithiasis in the elderly and old age, and postoperative mortality in older age group reaches 0.48-0.7%. However, the influence endocrine diseases and metabolic disorders on the course perioperative period in persons over 60 years of age with cholelithiasis not studied enough. The purpose of the work is to investigate the influence of endocrine pathology on the immediate results of surgical treatment of patients GSD in old age.

II. Literature review

For the period from 2015 to 2021 in the abdominal department Surgeries operated on 295 patients with cholelithiasis. There were women 206 (69.8%), men – 89 (30.2%) people. GSD was diagnosed on based on the results of physical, laboratory and ultrasound research. After the operation, histological examination of the removed gallbladder (GB) was performed.

Besides screened for metabolic syndrome (MS), thyroid pathology, calcium metabolism disorders and adrenal diseases. MS was approved according to the recommendations of the International Diabetes Federation 2005 [3]. Anthropometry was performed, waist circumference (WC) was measured, and body mass index was calculated. (BMI). Obesity was diagnosed if BMI exceeded 30 kg/m², abdominal obesity (AO) – with a WC value over 80 cm for women and over 94 cm for men. Biochemical parameters of blood serum, blood serum lipids, were studied using a Dixon Torus 1220 analyzer (Russia).

The function of the thyroid gland (TG) was studied using a Cobas 6000 analyzer (Roche, Switzerland) based on the levels of thyroid-stimulating hormone (TSH) and free thyroxine (fT₄). The euthyroid state was diagnosed when the TSH concentration was from 0.27 to 4.2 µMO/ml, sT₄ - 0.93-1.7 ng/dl. Ultrasonography of the abdominal organs and endocrine system was performed using a Mindray DC-80 device (China), using transducers with a frequency of 3.5-10.0 MHz. According to age, patients with cholelithiasis are divided into two groups. The main group included 107 (36.3%) patients over 60 years, in the control group - 188 (63.7%) patients under the age of 60 years. Calculations of the obtained results were performed using statistical program SPSS 11.5 for Windows. For check hypotheses about the normal distribution of values applied the test Kolmogorov-Smirnov. With a normal distribution of the variation series, the arithmetic mean (M) and the standard deviation of the arithmetic mean (SD) were determined if the data were not obeyed the normal distribution, set the small (min) and maximum (max) values and calculated the median (Meh). The relationship between quantities was studied using rank Spearman correlation with determination of the correlation coefficient (r). Critical significance level (p) for testing statistical hypotheses were taken equal to 0.05.

III. Analysis

63 (58.9%) people were hospitalized as planned elderly and senile patients and 139 (73.9%) younger patients age, urgent – 44 (41.1%) and 49 (26.1%) patients ($\chi^2=7.162$; $p=0.007$). For the first time, cholelithiasis was detected in 22 (20.6%) and 20 (10.6%) people respectively ($\chi^2=5.498$; $p=0.019$). In the main group there were 66 (61.7%) women and 41 (38.3%) men, in the control group - 140 (74.5%) women and 48 (25.5%) men ($\chi^2 = 5.291$; $p = 0.021$).

Obesity (BMI \geq 30 kg/m²) was confirmed in 37 (34.6%) patients over 60 years of age and in 80 (42.6%) patients under the age of 60 years ($\chi^2=1.812$; $p=0.178$), AO - in 92 (86.0%) and 145 (77.1%) people

($\chi^2=3.384$; $p=0.066$). Chronic calculous cholecystitis was detected in 73 (68.2%) patients in the main group and in 138 (73.4%) patients in the control group, hydrocele in two (1.9%) and two (1.1%) patients, acute calculous cholecystitis – in 32 (29.9%) and 48 (25.5%) people ($\chi^2=1.063$; $p=0.588$). Choledocholithiasis was diagnosed in 14 (13.1%) and seven (3.7%) patients, respectively ($\chi^2=9.037$; $p=0.003$).

Patients with accompanying somatic diseases received preoperative preparation on an outpatient basis, in a therapeutic or surgical hospital. In persons with choledocholithiasis, treatment was carried out in two stages: first, endoscopic transpapillary intervention with lithoextraction was performed, and then cholecystectomy (Che). The period from admission to the surgical department for cholecystectomy in patients over 60 years of age was 1-13 (Me = 2.0) days, in patients under the age of 60 years – 1-25 (Me = 1.0) days ($p = 0.007$). All operations were performed using multicomponent combined endotracheal anesthesia.

Laparoscopic XE was performed in 74 (69.2%) patients in the main group and in 171 (91.0%) patients in the control group, open XE was performed in 33 (30.8%) and 17 (9.0%) patients ($\chi^2= 23.019$; $p<0.001$). Cholecystectomy lasted 40-95 (Iu=75) minutes and 30-105 (Iu=65) minutes, respectively ($p=0.005$). Histological examination confirmed chronic cholecystitis in 75 (70.1%) elderly and senile patients and in 140 (74.5%) younger patients, catarrhal cholecystitis in five (2.7%) patients in the control group, phlegmonous cholecystitis in 14 (13.1%) and 34 (18.1%) patients, gangrenous cholecystitis – in 18 (16.8%) and nine (4.8%) patients ($\chi^2 = 14.864$; $p = 0.002$).

IV. Discussion

A positive correlation has been established between age patient and the severity of inflammation of the gallbladder ($r=0.176$; $p=0.002$). In persons over 60 years of age, the relationship between the destruction of the gallbladder and WC value ($r=0.239$; $p=0.013$), serum glucose values blood ($r=0.218$; $p=0.024$), level of calcium ($r=-0.450$; $p<0.001$). U patients under the age of 60 years, a correlation was found between destructive changes in GB and BMI ($r=0.145$; $p=0.048$), WC value ($r=0.212$; $p=0.003$), blood glucose concentration ($r=0.159$; $p=0.029$). POR was found in 14 (13.1%) patients in the main group and in six (3.2%) patients in the control group ($\chi^2=10.559$; $p=0.001$).

Purulent-inflammatory POO developed in nine (8.4%) elderly patients and senile age and in five (2.7%) younger patients ($\chi^2=4.990$; $p=0.025$); VET caused by decompensation somatic pathology - in six (5.6%) and one (0.5%) patient respectively ($\chi^2=7.583$; $p=0.006$). In one patient the main group, after conversion cholecystectomy for gangrenous cholecystitis, acute myocardial infarction occurred and the postoperative wound festered. There were no deaths.

In persons over 60 years of age, correlations were found between the frequency of purulent-inflammatory POOs and the level of TSH ($r=0.273$; $p=0.008$), hyperglycemia ($r=0.211$; $p=0.029$), open/conversion cholecystectomy ($r=0.235$; $p=0.015$). In patients under 60 years of age it is established the relationship between the development of purulent-inflammatory POO and the presence of diabetes mellitus ($r=0.158$; $p=0.030$), duration of surgery ($r=0.170$; $p=0.020$), severity of inflammation of the gallbladder ($r=0.159$; $p=0.029$). In patients of the same group, correlations were determined between POR caused by decompensation of somatic pathology and coagulogram disorders ($r=0.151$; $p=0.038$).

Patients in the main group were in hospital for cholelithiasis for 3-42 (Me=10.0) days, patients in the control group – 3-38 (Me=8.0) days ($p<0.001$). In elderly and senile people, a relationship was found between the timing treatment and WC value ($r=0.197$; $p=0.047$), TSH value ($r=0.304$; $p=0.010$), serum calcium concentration ($r=-0.250$; $p=0.022$). In younger patients, correlations have been established

between the duration of hospital treatment and the presence of EZ ($r=0.151$; $p=0.038$), metabolic syndrome ($r=0.145$; $p=0.047$), OT value ($r=0.188$; $p=0.010$).

So, the clinical picture of cholelithiasis in patients over 60 years of age had a number of features. There were more men in the older age group (38.3% vs. 25.5%; $p=0.021$). In operated patients, a relationship was determined between the patient's age and the severity of inflammation of the gallbladder ($r = 0.176$; $p = 0.002$). Choledocholithiasis was diagnosed in 13.1% of elderly and senile patients and in 3.7% of younger patients ($p=0.003$). Endocrine and metabolic disorders (MS, hyperglycemia, diabetes mellitus, hypothyroidism) were significantly more often confirmed in patients over 60 years of age with cholelithiasis (81.3% versus 67.6%; $p = 0.011$).

The presence of concomitant pathology and complications of cholelithiasis led to an increase in the preoperative period in elderly and senile patients (Me=2.0 days vs. Me=1.0 day; $p=0.007$). They were more likely to undergo open/conversion surgery (30.8% vs. 9.0%; $p<0.001$). XE in people over 60 years of age lasted longer (Me=75 minutes vs. Me=65 minutes; $p=0.005$). In patients of the older age group with cholelithiasis, more often purulent-inflammatory POO (8.4% vs. 2.7%; $p=0.025$) and complications caused by decompensation of somatic pathology (5.6% versus 0.5%; $p=0.006$).

Elderly and senile patients spent longer in hospital treatment (Me=10.0 days versus Me=8.0 days; $p<0.001$). The increase in the value of VOT in persons over 60 years of age is accompanied by increased frequency of destructive cholecystitis ($r=0.239$; $p=0.013$) and duration of treatment ($r=0.197$; $p=0.047$). Abdominal obesity is the main symptom of MS. Abdominal (visceral) adipose tissue synthesizes a number of biologically active substances that lead to metabolic disorders, hyperglycemia, and arterial hypertension. In addition, in patients with AO, fatty infiltration of the gallbladder wall is noted.

These factors contribute to the destruction of the gallbladder in calculous cholecystitis and create the prerequisites for a long hospital stay for patients with cholelithiasis. Chronic hyperglycemia in individuals with prediabetes and uncompensated diabetes mellitus causes dysfunction of neutrophil leukocytes, microangiopathy and deterioration of the blood supply to the gallbladder. With an increase in glucose concentration in elderly and senile patients, the frequency of destructive cholecystitis ($r=0.218$; $p=0.024$) and purulent-inflammatory POO ($r=0.218$; $p=0.024$) increases. Hypothyroidism is a well-known risk factor for cholelithiasis.

In patients with thyroid insufficiency, the properties of bile change, the motility of the biliary tract and microcirculation are disrupted, mucinous tissue edema occurs, and changes in blood coagulation and the activity of the cardiovascular system occur. In people of the older age group with cholelithiasis, hypothyroidism was diagnosed more often (15.9% versus 5.9%; $p = 0.016$), and the TSH level was significantly higher ($E = 2.1 \mu\text{MO/ml}$ versus $E = 1.6 \mu\text{MO/ml}$; $p=0.049$). Insufficiency of thyroid function caused the frequent occurrence of choledocholithiasis, contributed to the development of purulent-inflammatory complications after cholecystectomy ($r=0.273$; $p=0.008$) and led to an increase in the length of hospital treatment for patients over 60 years of age ($r=0.304$; $p=0.010$).

Hypocalcemia is the body's response to a severe, long-term illness. In patients of different age groups with cholelithiasis, no statistically significant differences were found in the concentration of calcium in the blood serum ($2.29 \pm 0.19 \text{ mmol/l}$ versus $2.30 \pm 0.20 \text{ mmol/l}$; $p=0.783$). However, in elderly and senile people, a negative correlation was determined between the calcium value and the presence of destructive cholecystitis ($r=-0.405$; $p<0.001$) and between the calcium level and the duration of hospital treatment ($r=-0.250$; $p=0.022$).

Thus, endocrine and metabolic disorders aggravate the course of cholelithiasis in patients of the older age group, which is accompanied by an increase in the frequency of postoperative complications and length of

hospital stay. In the future, it is planned to develop an algorithm for the supervision of patients with cholelithiasis aged over 60 years, taking into account the functional state of the endocrine system.

V. Conclusion

1. Endocrine and metabolic disorders were diagnosed in 81.3% of elderly and senile people with cholelithiasis.
2. Cholelithiasis in patients over 60 years of age is more often accompanied by complications (destructive cholecystitis, choledocholithiasis).
3. Postoperative complications were confirmed in 13.1% patients operated on for cholelithiasis in the elderly and old age. The development of purulent-inflammatory POC in the older age group is facilitated by increased TSH levels ($r=0.273$; $p=0.008$), hyperglycemia ($r=0.218$; $p=0.024$) and open/conversion surgeries ($r=0.235$; $p=0.015$).
4. In patients over 60 years of age with cholelithiasis, there are correlations between the length of hospital treatment and the WC value ($r=0.197$; $p=0.047$), TSH value ($r=0.304$; $p=0.010$), calcium concentration in the blood serum ($r=-0.250$; $p=0.022$).

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